THE NEON NEWS

THE NEON NEWS

ALL THE NEWS THAT'S FIT TO PUMP

VOLUME 1, NUMBER 2 WINTER 1990

POWERLINE TRANSFORMERS REVISITED:

More than you may have wanted to know

Shortly after our first issue came out I was informed that U.S. Transformer in Shakopee MN no longer sold used units. They referred people to B & B Transformer, also in Minnesota, at (612) 463-2573.

I called there and spoke with Denny, who told me that they sell rebuilt -- not used -- units for $265. (He also said that U.S. Transformer, now getting requests for these units, buys them from him at the same price and marks them up -- so get them at the source.)

The units that B & B sells are 10 kva, 14,400 volts (normally) but when they rebuild them for neon shops (using what they call a "straddle tap," a nice term) they are able to add 5 percent to the output voltage, bringing the units to about 15,000.

Denny said the unit he sells is a "totally rewound copper transformer with new oil in it, the whole works. No PCBs -- we buy our oil straight from Exxon. It's all brand new. Nothing is reconditioned in it except for the can and the bushings. The rest is all new."

Duane Anderson, Val's uncle who's an electrical engineer in San Diego, researched for us the differences between made-for-bombarding transformers and powerline units.

He spoke to engineers who actually design powerline transformers, and they said there's no reason that the transformers can't run "backwards" and be used for neon bombarding.

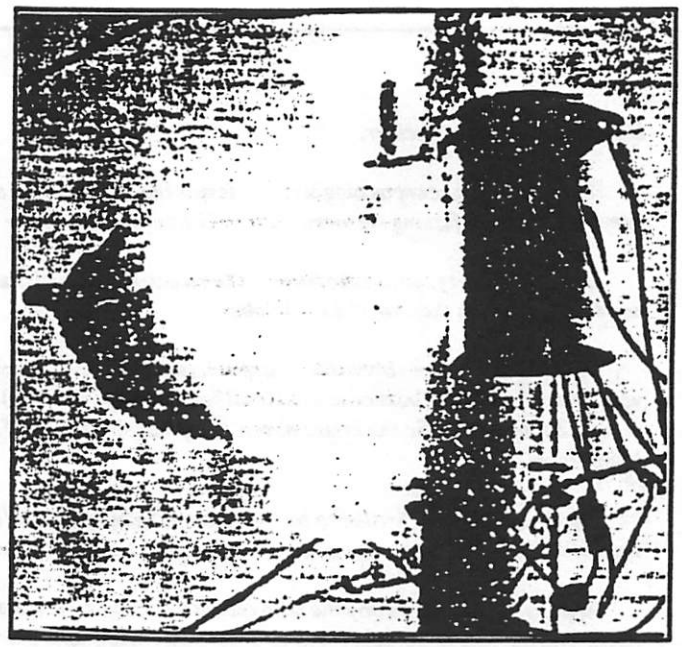
He also said that the local power company in San Diego sells used transformers.

Our local power company, after persistent nagging, did sell us a used transformer. Their initial reluctance to do so was because they viewed us as a competitor -- they didn't know about neon applications -- and only when we made it clear that we were not in the power-distribution business did they relent.

For $250 we purchased a 1965 Westinghouse 10kva unit. This has three connections on the low voltage end (240-volt output plus center "neutral" tap for 120-volt output), and is rated "7200/12,470." My assumption was that the 12,470 volts could be obtained with a 240-volt input on the left and right terminals.

Powerline transformers being not your average hardware-store commodity, Hawaiian Electric Co. had me sign a release waiving any possible claims against them. They also provided a "transformer sale agreement" that stated that

1) The transformer is in an "as is" condition.



Smokey the bear gets smoked: A 150-lb. bear gets a 7,200-volt shock in Albuquerque, showing one of the hazards of transformer rustling. The bear suffered a burned leg.

2) The transformer has been physically inspected to insure that there are no oil leaks and that it is in good physical condition.

3) Oil has been tested and found free of PCB contamination.

This type of transformer is commonly used around the country. However, I found out that it's really not suitable for neon. With an automotive oscilloscope hooked up I measured only 3,000 volts coming out!

By altering the primary input to where one of the 240-volt leads was on the mid-point tap, I was able to get about 5,000 to 6,000 volts out. This is enough to pump short channel letters, and barely light up 8'-long tubes (cherrying-out the electrodes prematurely, due to a low amount of air left in the tube, due to being unable to light it with

(see Transformers, page 4)

Trinkets of the trade: Tube testers we have known

One nice aspect of all this newsletter work for so little money is the freebies. Or rather, freebie.

Visual Electronics Ltd. of Vancouver, British Columbia, recently sent me a portable tube tester. Free. That was nice, especially with us setting up a new shop.

They also said they expect no special considerations -- just so you know.

Thus begins our short and inconclusive Portable Tube Tester review.

I've used three different models now. One was a Masonlite unit that had a defective switch, and the difficulties of returning things to Masonlite (customs, distance, postage, etc.) combined with general laziness meant that mainly it was a shelf tester.

The other model, well, I wish I could remember the name of the company. That's a problem. Anyways, it lit up the tubes all right. It also went through batteries like crazy, and if I remember right cost around $100.

The specs, then, on the Visual unit: Price is $79.75, not sure whether that's U.S. or Canadian. A 90-day warranty. Uses a single 9-volt battery, which does seem to last a while (one of their claims).

The brightness of the tubes being tested is quite good -- with the shade of one hand they're visible even in bright sunlight. You won't get a shock from the high-frequency 5K output either.

They claim that it can be dropped repeatedly from an eight-foot height onto concrete with no resulting problems. If they'd sent two testers we'd be inclined to try and verify this. (Not a hint, just a joke, guys.)

The size is quite small and pocket-able. The only problem that I noticed was that sometimes I'd go to test a tube and nothing, nothing, then when pressing the button again it'd finally light up. (Meanwhile a slight race in heartbeat, as these were my new tubes going up, a long way from home.)

So. That's Visual Electronics Ltd., 3842 W. 26th Avenue, Vancouver, British Columbia, CANADA, V6S 1P4 (604) 228-0419, fax (604) 228-9042. And remember, we don't take manufacturers' ads but we do review products. (Are you listening, turbomolecular vacuum pump manufacturers?)

January 15, 1990

Dear Neon News subscriber,

We send our sincere apologies for missing the fall issue. And for months of telling people that we were late, then saying we were very late, then confessing we were extremely late -- only at New Year's did we face the fact that there would be no fall issue.

But don't worry, your subs have all been extended one issue. And with a hundred new subscribers we have more contributors, material and ideas than we did in October.

After all, we haven't been idle. We purchased a decrepit but charming old rural home and moved across the ocean. Try that to raise your stress level! Val finished school (call her Doctor Crawford) and got pregnant (call her Mom?) and we started a new business: a neon shop, of course. So the crises haven't stopped since July. (For example, right now the shop is flooded and the roof leaks into the living room...)

We are, however, thrilled to be living atop the most active (and friendly) volcano on earth -- with a high mercury content in the lava soil and a certain orange-red glow in the sky, this feels like home. We'll let you know how heating glass over molten lava goes!

Our apologies too to anyone who called and didn't get a return call, or whose mail went unanswered for weeks and weeks. The house and office and workshop are in order now, and phone messages won't get lost in the shuffle. Thanks to the note in the October Signs of the Times, subscriptions nearly doubled. Many people have sent ideas and promised to send stories, so you'll see lots of new comrades-in-neon in this issue.

Thanks and aloha,

Ted Pirsig
Val Crawford

The Neon News is published "quarterly" (honest!) by Val Crawford and Ted Pirsig, P.O. Box 668, Volcano, Hawaii 96785; (808) 967-7648. Subscriptions are U.S.$15 annually.

Contributors, Vol.. 1, #2: Matt Thompson (cartoons).

Letters, photos, stories and story ideas are all welcome. Deadline for publication is one month before mailing -- for the Spring issue, March 15. Classified ads are 25 cents per word, payable in advance.

Signs of old times: Ad history from a global perspective

From "Sign Geography" by Barbara Weightman, in a recent Journal of Cultural Geography:

"The earliest forms of signs as public visual communication can be traced to cave paintings... In ancient Egypt, merchants cut sales messages into stone tablets, stelae, placed by the roadside.

"Roman triumphal arches, which functioned to carry messages in addition to channeling processional paths, might be regarded as the prototype of the billboard. In fact, the Romans introduced signs throughout their empire.

"In Britain, the first was the tavern sign in the form of a bush derived from ivy and vine leaves associated with Bacchus, God of Wine. As ale houses increased in number, differentiation in signs was called for. Since the masses were illiterate, pictures were used.

"Competition for visibility impelled European merchants to hang signs of gigantic proportions from bars across streets and from the fronts of buildings.

"In 1797, in England, after a series of injuries and deaths related to swinging and falling signs, along with collapsing building facades, a statute was passed ordering the removal of all projecting signs.

"...Billboards were an offshoot of the poster. Initially, billboard ads catered to the bicycle trade, displaying posters to be viewed by cyclists on Sunday outings. ...In the 1800s, both horses and vehicles were draped with signs advertising goods, services and forthcoming events. And giant models of products, such as hats, were trundled through the streets.

"(Today, signs for) liquor, cars and electronics are popular in North America while food and clothing ads dominate signs in Europe.

"With stepped-up industrialization, billboards, some of gargantuan proportions, proliferated in metropolitan areas, prompting citizen reactions against them. The battle abainst the billboard ultimately became an important aspect of the City Beautiful Movement of the early 20th century.

"...Reaction against signs is expressed in sign control efforts dating back to the early 20th century when courts upheld sign control ordinances on grounds of protecting health, safety and morals. Aesthetics became the rationale by the 1930s...

"Carmel, California, and Aspen, Colorado, have established 'no sign' laws. Scottsdale, Arizona, has a five-foot height limit as well as control over sign content and design. Ann Arbor, Michigan, regulates sign height, length of wordage and size of lettering and symbols. 'Local option' districts, with varying regulations depending on district needs, have been created in Seattle.

"However, regulation often means removal of signs, and some communities, such as Boston and Dallas, are seeking to preserve historically significant signs..."

Anyone out there know more about neon preservation or limitation efforts? I'll research a special issue of Planning, a professional journal for urban planners, on sign regulation for next issue, and need feedback on the wildly varying sign codes around the country. -- Val

Neon art news

"American Light Sculpture" at the Takashimaya gallery in Tokyo, opening December 7th. Lee Roy Champagne, Beverly Reiser and "14 or so other neon folks."

YLEM, Artists Using Science and Technology, P.O. Box 749, Orinda, CA 94563. This organization has an annual directory to "facilitate networking among artists, collectors, galleries and educators," and holds monthly forums in the Bay Area. A monthly newsletter covers exhibits and news of members (several work with neon), and lists "opportunities." Membership is $25/yr. U.S., $30 foreign, $15 student.

Two more galleries that embrace neon art (and artists):

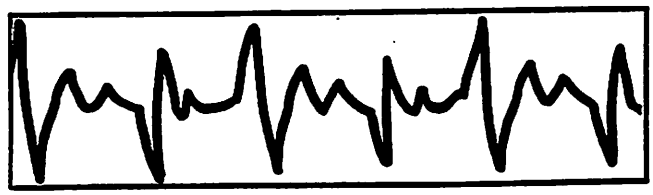
The Glass Studio
300 Cornell Dr., Suite A-8
Wilmington, DE 19801
(302) 888-2227

Accepts submissions for shows. Deals exclusively with neon art. Contact Pat Meyer at above address.

Pumpkin Centre Gallery
Attn.: Bob Ponkos
Rt. 7, Box 36
Ancram, New York 12502

(Referred by Nancy Hannmann of Neonically Speaking in Albany NY.)

Editors' note: Remember to tell us if your art is in a show: send us the gallery name, dates, and names of managers. Maybe they will hear from (and show) more neon artists! A few calls can make gallery managers aware that neon artists do more than flamingos and palm trees...



Cars and neon: Seperated at birth?

Cars and neon have high voltage in common. This shouldn't shock you. Some cross-breeding can result:

A single, short stick of clear red neon can be used as a timing light simply by connecting it in series with the Number 1 spark plug. This doesn't work as well as a timing light because it's not as bright. And there's the possibility of getting a shock if the wires aren't covered well. And watch out if the radiator fan should hit the glass! ...But you can use it in a pinch.

Another strange connection is that your car can tell you what speed your vacuum pump cruises at. (How many of you are really losing sleep over this one?) The way to find out is to drive your car -- with a low-rpm tachometer attached -- into the neon shop. Then hook a regular timing light to the car (the neon timing light offered above would have to reach too far). Make a chalk mark on the vacuum pump's pulley, and with both the car and the vacuum pump running change the speed of the car until the mark on the vacuum pump becomes motionless. Then check your tachometer for what the speed is. Then sleep better.

Also, an automotive oscilloscope can be used to measure the high voltage on neon transformers, including bombarding transformers. Our scope is an old Sears unit with an inductive pickup and both a 25-kilovolt and a 50-kilovolt range. As our transformer story in this issue notes, there's a wide variation in actual performance. See what that "15,000-volt" unit is really putting out!

(Transformers, from page 1)

any higher air pressure -- about 2-3 torr maximum at initial light-up.)

The amperage was correspondingly much higher -- even choked way down the output could hit a full amp without trying. The unit has a switch inside it, adjustable from "1" to "5," but changing that didn't affect the output voltage.

Denny at B & B transformer was able to clarify for me why a "12,470-volt" transformer did not, indeed, put out 12,470 volts:

"That transformer, even backwards, is 7200. It's called 12,470 but it's really 7200. If you're looking at the face of it, at the bushings on top, they ground the right-hand bushing to get 12,470.

"They ground that to the can and that's called a "grounded wye" and that's where they get their "12,470." That's the "wye" of 7200. See that "1.73"; you take that times 7200 and get 12,470. That's the top of the RMS curve.

"You can't do that if you're running the transformer backwards, putting in low voltage and taking high voltage off the top."

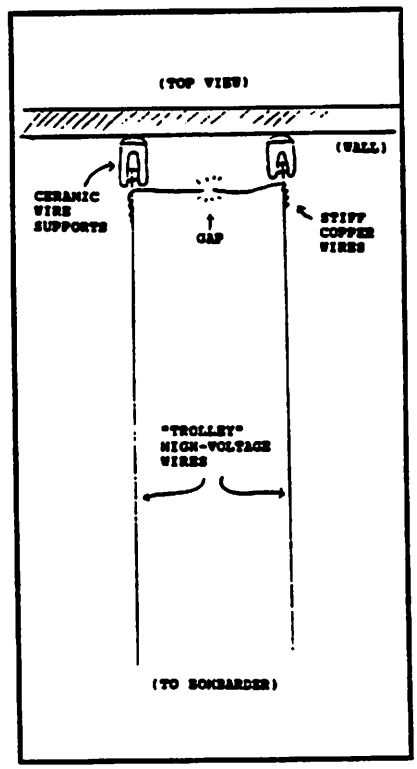
So if you do buy from your local company, be sure the unit is one of the "14.4"s (or higher).

A safety note: Fred Elliot of Neon Stuff in Salina, Kansas, warns that:

"The information about cheap bombarders could be dangerous and illegal. Most of those transformers are being replaced because they contain polychlorenated biphenyl (PCBs). That stuff is deadly poison.

"EPA standards are 50 parts per million is rated PCB free. California standards are 3 ppm and L.A. is 1 ppm. The oil is also flammable and is not recommended for inside use according to most local codes.

"If a person is to buy an oil-filled transformer they should make sure that the oil is R-Temp or a similar flame-retardant oil (very expensive)."



"Voltage-limiting" arrangement eliminates bombarder hole-popping.

A word about "KVA": Having a transformer of "10kva" or "15kva" doesn't necessarily mean beans when it comes to pumping neon tubes.

"KVA" stands for kilo-volt-amps, which is the number of volts times the number of amps, which, if we were talking about normal household stuff, would be called "watts." (Someone tell me why transformers are rated "kva" and not "watts.")

So a "10kva" unit is 10,000 watts, which is why the electric bill is so high. Since watts is volts times amps, you can have low-voltage, high-amperage units that will barely light a neon tube, yet are still rated 10 or 15 kva.

In simple terms, when bombarding it's the amount of air left in the tube that heats the glass, and the amount of amperage (controlled by choke) that heats the electrodes.

The higher the voltage from the bombarding transformer, the more air that can be in a tube when it is first lit up, and the more control one has over heating the glass before the electrodes get hot.

The bombarder voltage is not adjustable (with the exception of Masonlite's) -- different voltages are available on different units.

Bombarding transformers come in quite a variety of sizes, from 12,500 volts to 30,000 volts. It becomes easier to pop a hole through the glass with the higher voltages.

The only voltage-limiting device that I've seen (and use) is to have one wire from each of the high-voltage leads placed near each other. The wires are bent further-away or closer-to each other, and when set properly the bombarder, when about to pop a hole in the tube, will instead cease lighting the tube and arc between the two wires instead. With overhead "trolley" wires it looks like the illustration below.

Some specs on commercial units:

Masonlite's bombarding transformer has a voltage output of either 10,000 or 20,000 volts, with a switch to change from one to the other. Nice! This way, at the low voltage setting you get (presumably) higher amperage, for a speedier processing, yet have available the higher volts needed for longer tubes.

Transco's 12.5 kva unit has a 15,000-volt, 825 milliamp output, with a 60-amp input line needed. Their 7.5 kva unit has a 12,000-volt, 625 milliamp output with a 36-amp line needed.

In one shop where I worked we used the 12.5 kva unit and when run with the choke pulled fully out, the actual primary current was measured at 44 amps. However, the company won't warrant the units unless a full 60 amps is available.

Also, to figure what line current is needed for a given transformer multiply the kva times 4.8 (for example, 12.5 kva times 4.8 = 60 amps)

Voltarc/Hyde bombarding transformers (7.5 kva and 12.5 kva) are 25,000 volt.

For a choke I purchased a "Chokemaster" from Neon Accessory Co., Bensenville, Ill. This unit was $750 + freight (vs. $550 for a sliding-core type) -- as usual, when "custom made for neon" is attached to something, the price seems high, but the unit works quite well.

Instead of a large and heavy handle to slide, there are two parts to this: a small, easily mounted rotary dial, with numbers from 0 to 140 indicating the amount of choke (this is actually a 10-amp variac) and a heavy transformer (100-pound range) that sits under the bench and actually does the choking.

So a variac controls a transformer, which controls another transformer, which controls that tube you're lighting up. With our 10kva powerline transformer I use a fairly narrow range of the scale, from about "15" to "40" with a corresponding milliamperage output of 250 to 800.

It is nice to dial the unit to a certain number and get the exact same millamp output each time, regardless of tube size or length.

The "Chokemaster" is said to work for 5-kva up to 15-kva transformers, which had great appeal for me: if this powerline transformer doesn't work (the conclusion I've now reached), or if I get a different size later, I won't have to get another choke to

(see next page)

(from previous page)

match. I've heard that a sliding-core type choke needs to match the size transformer that it's made for.

Brent in St. Louis (whose last name I didn't catch) informed me that this unit sounds like a "saturable reactor," not a true transformer but a "mag amp."

He explained that a mag amp is a transformer that has two windings, a line winding that is wound one way and then an equal amount the other way, so it doesn't induce a voltage in the core -- it cancels out.

Then there is a smaller, low-voltage control winding, and by varying that (with the variac) you vary the impedence of the transformer. So you're controlling a huge amount of current with a small amount of voltage.

If someone knows of a good source for "saturable iron-core reactors" with 240-volt, 60-amp specs, let me know.

Tom Fling of Eurocom Imports suggests the following if you have difficulty choking down far enough: plug in a "fixed choke" in series with the adjustable choke.

This will drop the entire bombarder down a range.

These are available at "heavy-duty electrical suppliers" and need to be calculated with the transformer size, the adustable-choke rating and a good head for math (plus the right formula, of course).

In appearance these units are a block of plastic about 1/2" thick, 2-1/2" square with two copper blades on them.

As a side note to this article, it would be impossible to see what's really going on in the pumping/bombarding system without having a number of guages, which I heartily recommend:

-- a milliamp guage (Best price I've seen: $58.50 from Eurocom Imports, (214) 369-2321) for determining the amount of choke;

-- a pirani guage ($375, HPS) to check ultimate vacuum; and

-- a diaphragm-type guage for gas filling ("Javac C70," $375, approximately, from Masonlite). This gas-filling guage eliminates both the butyl phylate oil and a stopcock, and is constantly "on."

The amount of pressure in the tube is always shown (be it atmosphere, neon or argon), and with these guages the pumping is now a simple game of set-the-numbers. It takes about 5 minutes to show an assistant how to do it.

If anyone knows of better prices on similar units, please let us know.

Another safety note: After years of using a footswitch for bombarding, I've set up something much more foolproof -- which was first suggested to me by a bender from Cleveland whose name I've forgotten.

There is a handle portruding from the bench, with a place for each hand. Both hands are required to energize the bombarder.

This way if someone tickles you, there's no way you can throw him or her onto a hot lead.

There are two momentary-contact switches in the handle, wired in series, which provide 24 volts to the contactor, which in turn switches on the main power to the bombarder.

This is all in addition to a main on/off switch and a red light bulb indicating that the system is energized.

A good book for further reading is Basic Electrical Power Distribution, Anthony Pansini, Hayden book Co., Inc., Rochelle Park, NJ. (Our library lists but does not carry this, so anyone with an extra copy...)

A "job from hell" goes Hollywood

From L. A.'s Richard Jenkins, writer, neon designer and installer of the unusual:

"To be quite honest, I think the whole neon industry is very hard. Just the nature of neon being so darn fragile, and problematic on top of it.

"What I do is even more difficult, because I freelance for companies, and most of the stuff I do is for the motion picture industry or private parties or corporate theaters or rock videos. In fact we did an installation four days ago for Disney, down at the Spruce Goose here in L.A., the Howard Hughes plane.

"They built this huge stage down there for this special event they're doing, so what we did is we hung about twenty units on this stage, and we hung it on chicken wire, so that you could see through the neon to the back side of some other lighting things they were doing.

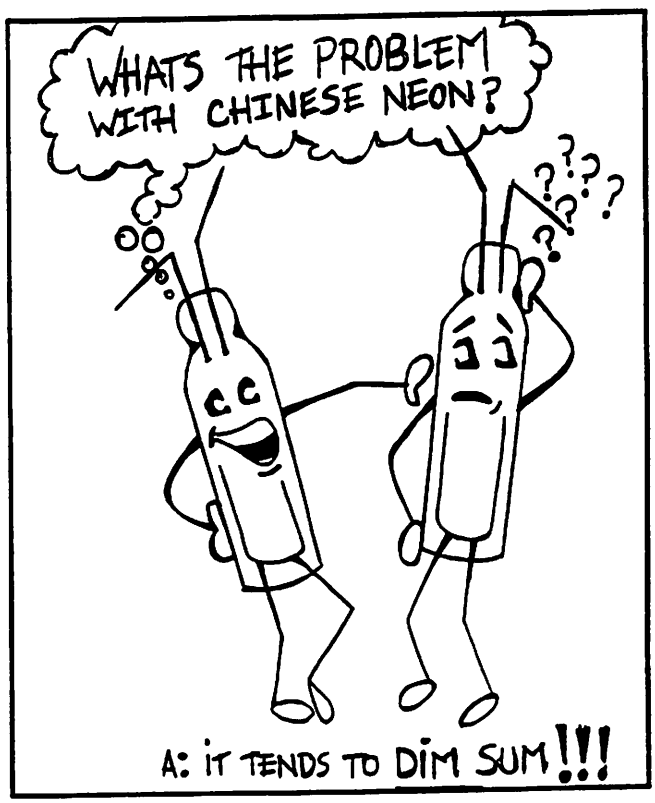
"All of a sudden, we get a call three hours after the installation is finished, telling us the "A" is broken. So we go down there and we can't figure it out, but the "A" has been broken.

"We replace it, and two hours later we get another call -- the same "A" is now broken again, and they swear no one has bumped into it. So we replace it again, and get a call the next day -- three letters are broken.

"This big mystery is going on -- why is the glass breaking? It's all booted, it's got high-voltage wire...

"Turns out that minute little arcs jumping back and forth from the chicken wire onto the neon are causing the holes to break in the glass.

"The entire installation now has to come down and be completely redone. People all over the country usually hang neon on chicken wire for certain kinds of things, and it really doesn't work. Sometimes you get an art director who insists you do something like that though."



Obscure suppliers and dream-book catalogs

The Neon News will publish information about companies and organizations that may be little-known in the trade yet provide tools, materials or information useful for neon people.

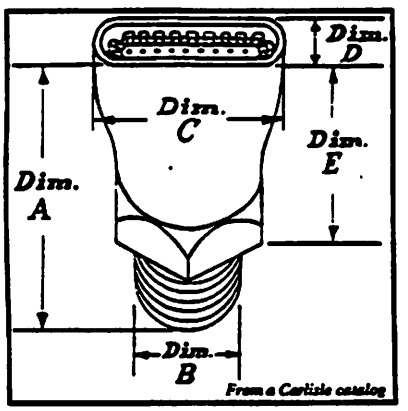
How often we publish this and who we include or don't include will vary, but we'd like readers to send in their own sources -- and especially send in reports of good or bad service, products, etc.

As we live, work and consume in Hawaii, the land of endless mark-up, we take our mail-order suppliers very seriously and suspect that others in isolated areas do too.

Here are a few:

Carlisle Machine Works, P.O. Box 746, Millville, N.J. 08332; (800) 922-1167, (609) 825-0627:

Carlisle provides "industrial gas burner equipment" and, like both Bethlehem and Wale below, has a range of torches and lab-glass lathes that make you realize there's a whole big world of glass-working out there that we never touch upon.



Of use to neon people:

Precision needle valves, for adjustment of gas (ours were about $14 each and made a world of difference over anything the local supplier could come up with), "fish tail" burners, venturi mixers, flashback arrestors, hand torches, torch tips, crossfire components (they sell individual parts, which is nice for building your own setup), and "gas saver" on/off torch systems.

Bethlehem Apparatus Company, Inc., Hellertown, PA 18055; (215) 838-7034.

Bethlehem also has a large range of glassworking equipment, mainly lathes and torches.

They are BIG on mercury: distilling it on a large scale, selling a nifty (but $900) "hg vacupick" to clean up mercury spills, and sending some long, old (1950s) but still interesting articles on mercury along with their catalog (they take their mercury purity very seriously).

As with Carlisle and Wale, someone with a big budget could have a lot of fun with the more esoteric glass-lab equipment.

Wale Apparatus Co., 400 Front St., P.O. Box D, Hellertown, PA 18055. (215) 838-7047

This glass-lab supplier offers burners, needle valves, flashback arrestors, crossfire components, venturi mixers, "gas saver" systems, high-temp glass tapes, high-temp gloves, glass knives, blowhose swivels, glassworking tweezers and Pyrex glass stock.

Wale also lists the hard-to-find book Creative Glassblowing, Scientific and Ornamental by Hammesfahr and Stong ($21). This book is the only one I've seen that gives detailed step-by-step instructions, assuming you know nothing at the start, on how to adjust flames, make basic bends, build a polariscope, select tools, build an annealing oven and work with solid glass, and it builds up to the level of sophisticated lab-ware glassblowing.

Thrown in too (though not my cup of tea) is a lot of instruction on the building of glass boats, fish, candlestick holders and the like.

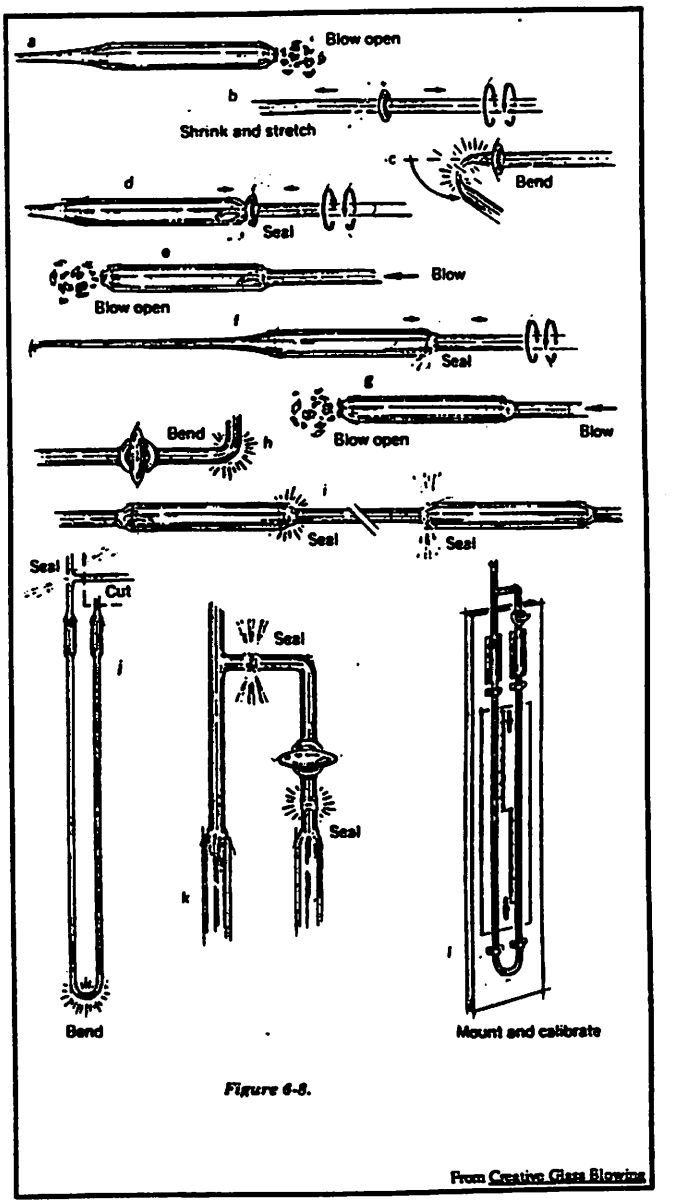


Figure 6-8.

From Creative Glass Blowing

Gary Burke of Oakville MO submitted the following two resources:

Robbins Valve Co., in California, (714) 630-0671. He said a Mr. Chris Johnes is a good source of advice concerning metal manifolds.

J and P, in New Jersey, (201) 779-6158, offers a "tempting catalog of industrial burners."

Grainger has branches all over the country -- consult your local phone book. Their sales policy is wholesale-only, so if you are an individual looking to buy, either get an established business to do it for you or take out a license of your own.

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They carry a huge range of motors, valves, and electrical components (footpedals, contactors and the like for bombarder setups) and also Sargent-Welch vacuum pumps. Their prices aren't cheap but their variety makes them valuable.

Mostly for fun

Jerryco Inc., 601 Linden Place, Evanston IL 60202; (312) 475-8440.

Jerryco deals in military and industrial surplus, with a lot of kitsch thrown in. "An affiliate of American Science Center," Jerryco also handles their extra optics and chemistry apparatus, and even has plastic rats, roaches and salamanders to please your squeamish friends.

The best part is just reading the catalog, as they clearly have fun writing it. For example:

"THEFTPROOF SCISSORS: These Pakistani lovelies were imported as 'Surgical Instruments,' but it was someone's idea of a sick joke. While it is true that they are 5" scissors, and while it is true that they cut well, it is not true that anyone finished making them ... they are so terminally ugly that nobody would even think of swiping them. Just think, a pair of scissors you can leave right out on your desk with your only risk being a nasty note from an offended potential thief! By the way, these are nominally 'stainless steel,' but it's a moot point!" (Finally, truth in advertising.)

While the bulk of the items don't necessarily interest neon people, really valuable things do come along now and again (they put out six catalogs a year). In our shop we have their solenoid valves, magnets, transformers, blowers, nichrome wire, switches, quartz lights, polarizing filters... but then again, I like to tinker.

Hawaii* Valve and Fitting Co. (*Most states have their own, i.e., Minnesota Valve and Fitting Co. -- check your local phone book.)

These companies offer a dazzling (if confusing) array of vacuum system components, from glass-to-metal connectors (Cajon brand) to precision valves useful for metal-flask gas-transfer systems. I'm waiting to hear on the performance of certain valves...

Precision Scientific Group, GCA Corporation, 3737 W. Cortland St., Chicago, Ill. 60647; call (800) 323-4308 for nearest distributor (ours is our local chemical supply house).

The bulletin I have (#100c) looks a bit dated but lists a variety of interesting apparatus: they manufacture "VacTorr" brand two-stage vacuum pumps, in six sizes from 25- to 1500-liter, "guaranteed ultimate vacuum 1 x 10-4 torr" and "quiet -- fast." Anybody use these? I haven't heard of them before.

They also have metal diffusion pumps, in-line traps, thermo-couple guages, pump oil, vacuum tubing, and a large variety of vacuum fittings (couplings, connectors and the like).

HPS Division of MKS Instruments Inc. has distributors around the country. Call (800) 345-1967 for catalogs, answers to technical questions and the location of the nearest distributor.

HPS carries high-vacuum equipment, and has a very nice feature in their catalog -- prices! (Peter Mason, are you listening?) This allows us day-dreaming types to either dream on or come to earth in a hurry .

HPS manufacures metal-manifold components and valves that fit together with the "ISO-KF" type fittings ("centering" rings and toggle clamps, good to 10-7 torr), allowing any part of the system to be removed or replaced instantly. Most of the components are stainless steel but brass, copper and aluminum are available too.

These don't come cheap; my main manifold valve was $400, but then, I'll never ever grease it, it has a very light touch and is a joy to use. The products in general are very finely crafted.

HPS has the cheapest (yet nicest!) pirani guage system that I've seen, at approximately $375. This unit has a handy feature -- two "set points," which are adjustable and will trigger an outside circuit. This means that a bell could go off when the vacuum reaches 1 micron, or that some lights will come on at 30 microns, telling you to open up the diffusion pump... Or whistles and sirens and -- well, you get the idea.

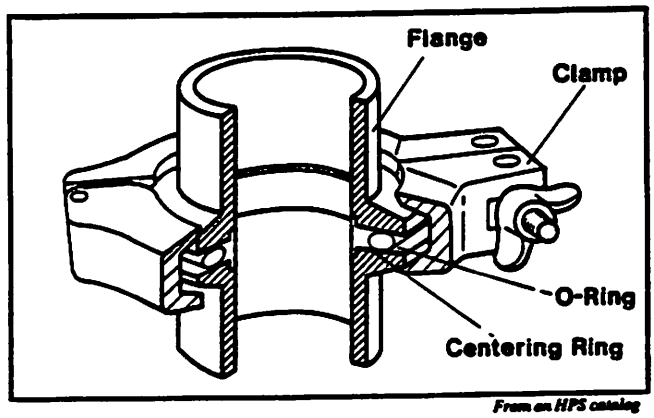
They also have a digital-readout pirani guage (more $) and for ultra-high-vacuum another pair of guages (much more $).

A few words of caution about pirani guage "sensor" tubes, the part that actually hooks up to the manifold:

-- They cannot have any gold in them which would be exposed to the vapors in the manifold, as the mercury will amalgamate with it and create erroneous readings. HPS, when called, stated that their sensor tubes definitely do not have gold; they have platinum with a silver brazing alloy in the exposed-to-vacuum portion.

-- If using the sensor tube on a glass manifold, a high-voltage flashback will ruin it -- there must be some provision for the flashback to become grounded before reaching the sensor tube.

-- Also, a sudden inrush of air can break the wire in the sensor tube -- either some kind of air-rush-prevention filter, or general caution, is need to prevent this $100 "oops." (Val says, "Ted, confess!" It's true -- I'm waiting for my replacement sensor tube right now.)



From an HPS catalog

COMING NEXT ISSUE:

■The tubebender who made it to the FBI's #1 Most Wanted list. ■How to build a versatile, portable color chart with 110v switches. ■The new improved Techno-Turbo Mach-III oxy-boost twin-pedal torch. ■Wanted: First-hand reports of metal-manifold building/use/problems, and solid-state transformers: which models do you use or not use, when and why?

Readers write the Neon News

Tell Madge about it

Our cartoonist, Matt Thompson of Kaneohe HI, says he noticed a bottle of Palmolive dish soap glowing merrily in his dark kitchen one night. He had some tubes lit up in another room, but he noted that they were two rooms away and around two corners!

Let there be light tables

Pat Meyer of Custom Neon Designs Inc. of Wilmington, Del., writes: "Has anyone come across a good product for holding electrodes and the short ends of glass? The regular pronged electrode holders don't seem to give a firm enough grip.

"In response to Susan at Savage Neon: when handling fragile glass, try bending without the screen onto a flat table. I realize a lot of people learn to bend with a screen, but bending on a flat table alleviates the stress caused by a cold metal screen, and provides a flatter, better-looking finished piece.

"Patterns can be transferred easily by reversing the pattern paper on top of a light table, then placing a piece of nonsbestos or ultrasil on top, and tracing with a standard felt-tip marker.

"A simple light table can be made by placing clear plex over a wood frame. For lighting, use 6500 snow white tubing bent to zig-zag back and forth the width of the plex until the whole opening is lit. Place this on a shelving approximately 3-4 inches under the plex. Attach a transformer, and wha-lah! A homemade light table, for quick, precise transfer of patterns. The newer pattern papers on the market today are much thinner and lighter-weight than their predecesors, and can sometimes be used without the aid of a light table."

Editors' note: We've even brought our neon light table to installation sites, to transfer drill-marks from the pattern to the channel-letter cans in unusual mounting situations. Great for those midnight installs -- if a bit surreal-looking to passersby.

Tips for the paranoid

Brent Geddie of Geddie Neon in Newnan GA writes that he is hungry for reliable information about products and suppliers for the neon trade. He says that information is sometimes jealously guarded, and he notes that "one shop, whose owner travels the world, even spray-paints transformers and pots them in epoxy so that nobody can tell where they came from.

"But we all have our ways."

Breakthrough: Belfry buzz banished

Larry Volz of Hilo HI told me about a California church with neon in the belfry that he serviced in the 1960s. He said that to get rid of any buzzing noises, they had mounted each transformer on four automotive valve springs!

Rx for stress-induced stress

Morgan Crook of Neon Design, Columbia SC writes: "A couple comments on a couple of subjects -- actually one subject -- Breaking Glass (stress induced).

"Volume 1 / Issue 1 contained a short article on Long Gradual Curves. I used to have a problem when joining (splicing) together these pieces; when I would attempt to cut the glass, many times it wouldn't break off square, but a long split would appear on the table side of the glass; trying to cut the glass back further and further and ending up with just a nub and having to splice in a long section.

"To avoid this problem (almost always): after making the bend on the table, after the glass is no longer plastic, pass the heated area back and forth twice, slowly, through the ribbon burner. And let it cool in the air -- not on the table! This greatly reduces stress (and the difference can be seen through a polarascope).

"Just used a great product for the first time the other day: machine-drawn colored tubing by P.J. Mason. The wall thickness was even (unlike hand-drawn) and therefore, much easier to work with. I was using 15mm uncoated cobalt blue and with reasonable annealing had no breakage. It also had no problems on the pump table. Right now, it can be hard to find, but with more and more Mason stuff coming to the U.S. it should be easier. Remember: not all of Mason's colored glass is machine-drawn. You need to get your distributor to check."

Twists and turns of the trade

Bob Lind of Old Orchard Beach, Maine, writes:

"I've been in the business since graduating from Egani in N.Y.C. in 1947, and during the lean years obtained electrician's licenses in N.H. and Mass.

"At present working in a neon room at Bailey Signs in the Portland, Maine, area and enjoying doing the work I started at in '47.

"I've had the opportunity to work and visit in glass rooms in West Germany, where neon is very strong, and they've got some pretty good technologies.

"The following are some thoughts and wishes I'd like to pass on to you:

"1. Standardize fluorescent colors among manufacturers, especially whites. Voltarc's 4500 is as close as you'll get to cool white lamps, but EGL's 4500 matches Voltarc's Snowwhite -- EGL's 3500 is bluer than Voltarc's 4500, a contradiction if one is to believe that the lower numbers are warmer.

"2. Eliminate 15,000 volt transformers and offer a 35-45 MA transformer for colder climates and larger-diameter tubing.

"3. An annual workshop / seminar & convention for neon.

"4. Best of luck in your new endeavor, and how about an article called: The trials and tubulations of a glass bender!"

It huffed and it puffed...

A bender who asked to remain anonymous (and, as far as we can tell, doesn't work for Gast) writes:

"Susan Steinberg of Savage Neon asked about a efficient, quiet air blower. I worked in one shop that had an air blower from GAST MFG. CORP., P.O. Box 97, 2300 Highway M-139, Benton Harbor, Mich. 49022; (616) 926-6171. They have distributors nationwide.

"This is a regenerative-type blower. Briefly, as the blower impellor rotates, creating centrifugal force, it moves air from the root of the blade to the blade tip. Leaving the blade tip the air flows around the housing contour, back down to the root of the succeeding blade, where the flow pattern is repeated. This action provides a quasi-staging effect to increase pressure differential capability, resulting in a very effiecient, quiet operation. Most blowers are of the direct-drive type. The model I've used is R1102C; they do come in all sizes.

"I feel it's important to add for people who have never used

(see next page)

(from previous page)

a centrifugal-type blower: you must think volume air flow, not pressure. To obtain maximum performance, your blower outlet should be the same size as the inlet and should exhaust directly into a manifold not much smaller than 4" diameter. Another important item: if you use venturis at the fires you must drill them out (straight through) anywhere from 3/16" to 13/64" diameter.

"One last important item: be sure to install the factory-type air filter offered with the blower. It quiets the blower even further and prevents screen-type burners from plugging with dust or dirt.

"This is one sweet little blower, and they are absolutely maintenance-free!"

Editor's note: I just set up a Gast blower in our shop and am quite happy with it. I've also used the Spencer Vortex blowers, and they are nice and quiet too.

To determine what size blower you need, count your torches and add up the numbers as per the chart on page 114 in the Neon Techniques and Handling book. Note that the chart lists the air volume as "cubic feet per hour" (cfh) and that blowers are rated by "cubic feet per minute" (cfm), so take the figure arrived at with the Miller chart and divide it by 60.

For my single-person shop with 16" ribbon torch, hand-torch, cannon-fire torch and crossfire torch I calculated about 25 cfm required, and got the 42-cfm unit>.

Also, to respond to Susan's question about "why not?" using compressed air -- actually, you can. I once worked in a shop that had a little compressor (the kind found in copy machines, and then in surplus catalogs like Jerryco) running a crossfire.

The flame fluttered annoyingly and rapidly from the compressor's "on-off" pulse, and the torch's air valve needed adjusting several times a day due to fluctuating output from the compressor, but it did work.

This compressor, however, did nothing but feed the torch and stay on constantly -- a large compressor that feeds other equipment and/or shuts on-and-off would, I suspect, fluctuate too much for a torch to stay lit well.

Reciepes for neon cuisine

This same reader sent a nice long second letter on "a couple things":

"Matt Thompson expressed problems with Voltarc ultra-blue stress-cracking. I, too, have had an ongoing problem with 15mm size. A bushy flame and post-heating seem to prevent cracking.

"A Mr. Tim Wilson Sr., who is a manufacturer's representative for Voltarc (415-943-1463) seems to think the glass tube suppliers are using less lead oxide, which results in this problem.

"Norbert Poeschl of Sign Tech asks about a sucessful method to clean uncoated ruby red tubes. The April 1987 Signs of the Times column by Dean Blazek was a very good article about ruby red glass and its problems.

"Myself, I do not clean novial tubes before pumping. I complete the bending, then wash out un-coated tubes with a straight solution of hydrocloric acid, hot water rinse, air blow dry. After attaching electrodes, I: 1) Preheat (100 C) to remove all remaining moisture, which also reduces the risk of cracking, and then pump out and cool to 50 C. 2) Cover as much tube as possible with several layers of non-bestos, preventing rapid cooling, which can restrict the vacuum pump from removing as many impurities as possible in the form of vapors. 3) Back fill with 8-10mm of air. 4) Begin bombarding, taking care not to heat glass too quickly, both preventing a crack and allowing time for vacuum pump to remove impurities, and heat to between 300-350 C (see note #1 below). 5) Allow to cool to 150 C, back fill with 4-8mm of quality flushing gas, re-pump to 300-350 C (don't overheat electrodes, see note #2). 6) Repeat step 5. 7) Around 50 C back fill with rare gas, and allow far longer burn-in (overnight). If tube runs hot or shows dark areas, remove and discard electrodes, clean again with acid and repeat entire process.

"Note #1: Vacuum pumps having greater than 40 liters/minute free air displacement (1.4 cfm) and ultimate pressure 1.0 micron afford some of the best processing. When working with pumps less then this I use open main-stopcock during most of processing, with good results.

"Note #2: Natural gas (city gas) might seem a good substitute for flushing gas but one cannot always guarantee its purity and it is hazardous because of its combustible nature. It is important to follow the recommended pumping and flushing procedures of the electrode manufacturers.

"Coated tubing: I do not use acid flush. Water and air blow-dry only, depending upon age of tube and strength of powder binder. Acid could remove the phosphor. Coated tubes are cleaned very well before coating."

Street legal?

Roger Schurman of Gas 'N' Glass Neon in Ridgefield WA is wondering if anyone has tips for doing installation of neon on automobiles.

Notes from all over

A lot of people sent letters too nice to print. They like the idea of the newsletter and various things about it, but we are short on space and our egos are too big already to justify printing these here. But we send thanks to all:

-- to Rick Beale of Orland CA, "Daytime Bender / Nighttime Neon Scholar and Searcher of the Great Neon Truth";

-- to Ray and Carol Hall of Abilene TX, who "hope to re-gas the old trade";

-- to Kathie Laffianchi at Renaissance Neon in Lancaster CA for the promise of tales to come;

-- to Renay Murray of Tampa FL for her offer to contribute articles (though we can't pay for them for a while yet).

-- to Maureen Harvey of Studio One Neon in Santa Fe NM for cueing us in on a mystery: does anyone know what happened to the Center for Neon Art in Phoenix?

-- to Doug Solyan at Uptown Neon in Richmond VA for sharing (we hope) the names of several fifty-year veteran benders with us, so we can pester them on the phone for a later issue. Any other senior benders (thirty-plus years?) are sincerely invited to call and tell us what you think has changed in the trade over the decades.

Our favorite logo (so far):

© Captain Neon Ltd., Charlotte NC

The Neon Bulletin Board

Pat Brown of Spectrum Neon (Pinellas Park FL) writes: "I work with a really nice man by the name of Manton Giles. He taught tubebending in the General Industrial Training Institute in Steubensville, Ohio, in the 1950s. His students were vets who recieved their schooling on the G.I. Bill. They came from all over the country. He often comments on where his students might be today -- any of Manton Giles' former students please write him c/o Spectrum Neon. (6531 43rd St. N., Suite 1602, Pinellas Park, Fla. 34665)

Peter H. Blum of Stroh's Brewery is interested in locating any old Stroh's signs for the company collection. Write him at 1030 Balfour Road, Grosse Pointe Park, Mich. 48230.

Steve Clucas of Spectrum Neon in Pen Argyl, Penn., wonders "which tube temperature guage will do the required job and not cost over $250?"

Marianne Randon of Olean Signs in Olean N.Y. answers Jed Vallings' query from last issue: "Neon phones in pink or blue are available for $395 from The Cat's Pajamas, 20 Church St., Montclair, NJ, 07042. If he finds one cheaper, please have him let me know."

We will let you know, Marianne. Max Marketing (19807 Sussex Drive, St. Clair Shores, Michigan, 48081, (313) 773-5000, fax 772-6224) sent us photos of their neon phones, calculators and clocks. (They advertise that they offer "unique products for people who never grew up, but their allowance did!")

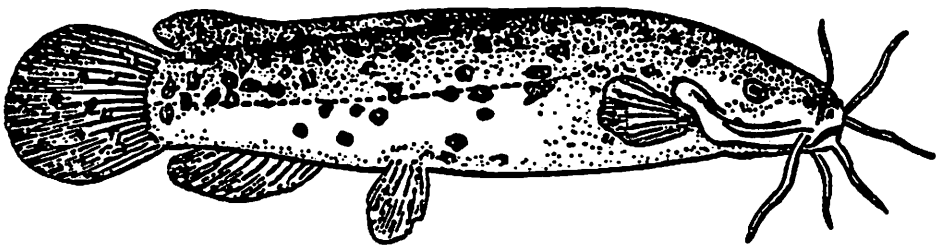
The dealer cost on the phones is $159 regular, $169 for classic glass. The calculators come in pink, blue or green tubing and are $120. The clocks are $135, or two or more for $125 each. Freight is additional. The phones have a transparent case with a circular tube ringing the base (no pun intended) and the calculator is also in a transparent case with a three-sides-of-a-square tube at the base.

The clocks are different from other neon clocks I've seen -- no numbers on the dial, sort of 1920s art-deco with a half-circle of exposed neon and then the tube running back behind the face of the clock, which is translucent and changes the color of the tube. The bottom third of the clock face is opaque black with a light along its top edge.

Now, does anyone else have other "functional" ideas for neon? We have tried house-number signs (great for helping party guests find your house) and nightlights for children that spell out their names. Any other household applications?

Classified Ad

TUBEBENDER/APPRENTICE WANTED for growing neon studio; experience and salary negotiable. Custom Neon Designs, (302) 888-2227.



Electric Catfish (Malapterurus electricus)

"Africa has an Electric Catfish that is found in both the Nile and Congo River complexes. The animal grows to a length of four feet and can weigh twenty pounds. The electric output probably doesn't exceed 90 volts, at a tenth of an ampere.

"The form was known for its peculiar talent even to the ancients. Egyptian heiroglyphics dating to 4000 B.C. call it by the name, "He Who Releases Many," the implication being that fishermen hauling in nets in which a specimen was caught would get enough of a jolt to make them drop the nets and lose their catch." -- from Dangerous to Man, by Roger A. Caras

THE NEON NEWS

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